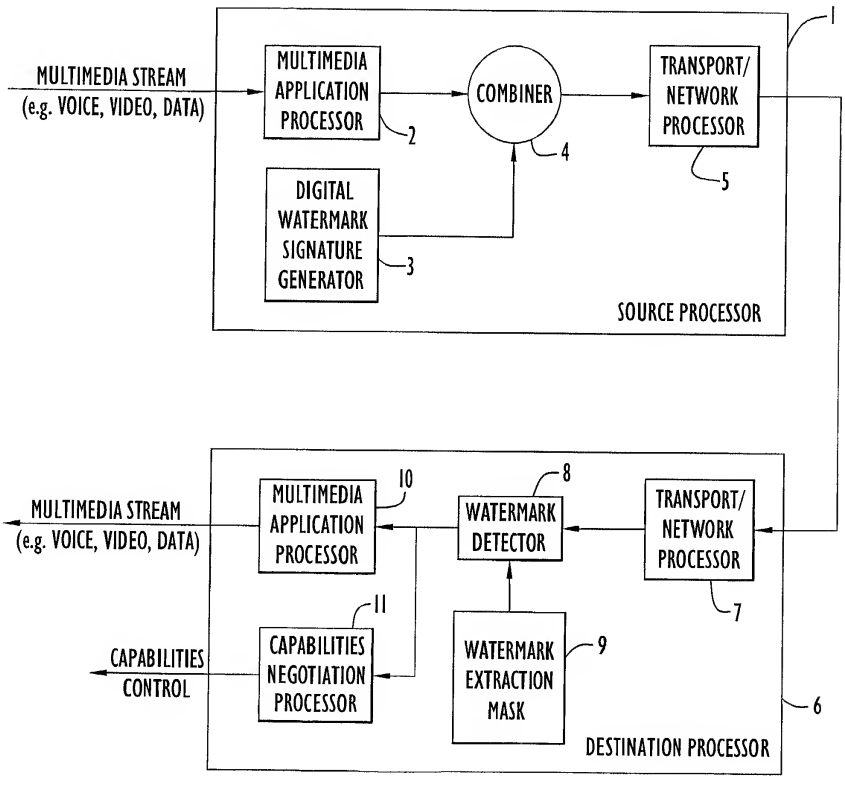
MULTIMEDIA STREAM
(e.g. VOICE, VIDEO, DATA)
MULTIMEDIA APPLICATION PROCESSOR
2
COMBINER
4
TRANSPORT/ NETWORK PROCESSOR
5
1
DIGITAL WATERMARK SIGNATURE GENERATOR
3
SOURCE PROCESSOR
MULTIMEDIA STREAM
(e.g. VOICE, VIDEO, DATA)
MULTIMEDIA APPLICATION PROCESSOR
10
WATERMARK DETECTOR
8
TRANSPORT/ NETWORK PROCESSOR
7
CAPABILITIES CONTROL
CAPABILITIES NEGOTIATION PROCESSOR
11
WATERMARK EXTRACTION MASK
9
6
DESTINATION PROCESSOR

FIG.1

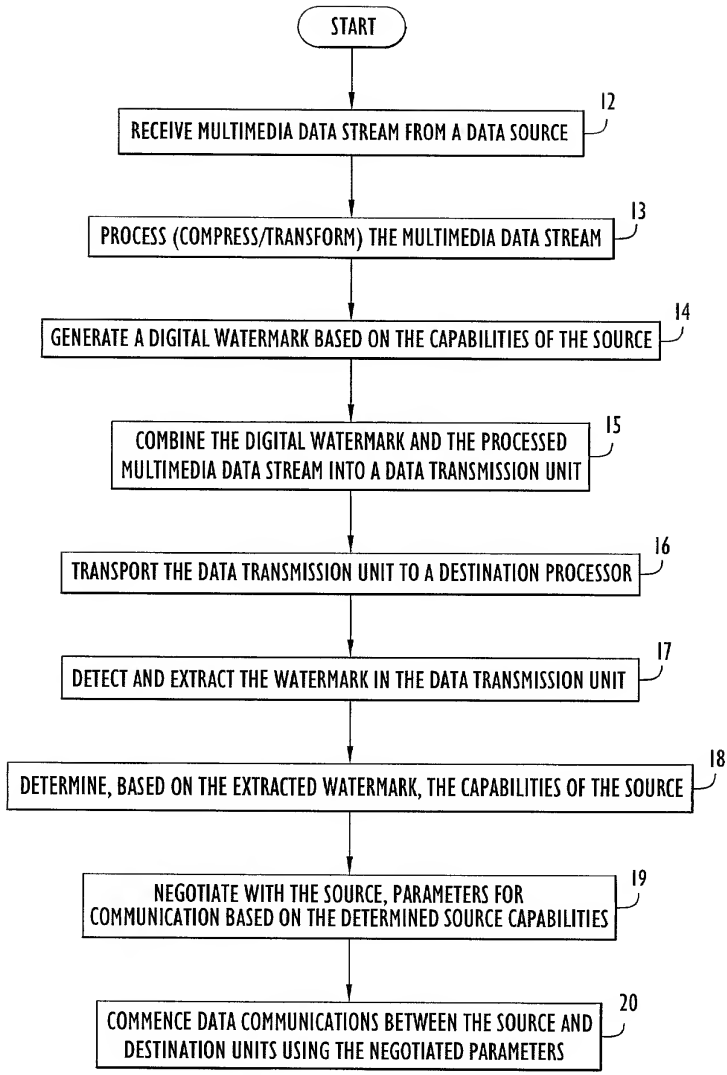
START
RECEIVE MULTIMEDIA DATA STREAM FROM A DATA SOURCE
12
PROCESS (COMPRESS/TRANSFORM) THE MULTIMEDIA DATA STREAM
13
GENERATE A DIGITAL WATERMARK BASED ON THE CAPABILITIES OF THE SOURCE
14
COMBINE THE DIGITAL WATERMARK AND THE PROCESSED MULTIMEDIA DATA STREAM INTO A DATA TRANSMISSION UNIT
15
TRANSPORT THE DATA TRANSMISSION UNIT TO A DESTINATION PROCESSOR
16
DETECT AND EXTRACT THE WATERMARK IN THE DATA TRANSMISSION UNIT
17
DETERMINE, BASED ON THE EXTRACTED WATERMARK, THE CAPABILITIES OF THE SOURCE
18
NEGOTIATE WITH THE SOURCE, PARAMETERS FOR COMMUNICATION BASED ON THE DETERMINED SOURCE CAPABILITIES
19
COMMENCE DATA COMMUNICATIONS BETWEEN THE SOURCE AND DESTINATION UNITS USING THE NEGOTIATED PARAMETERS
20

FIG.2

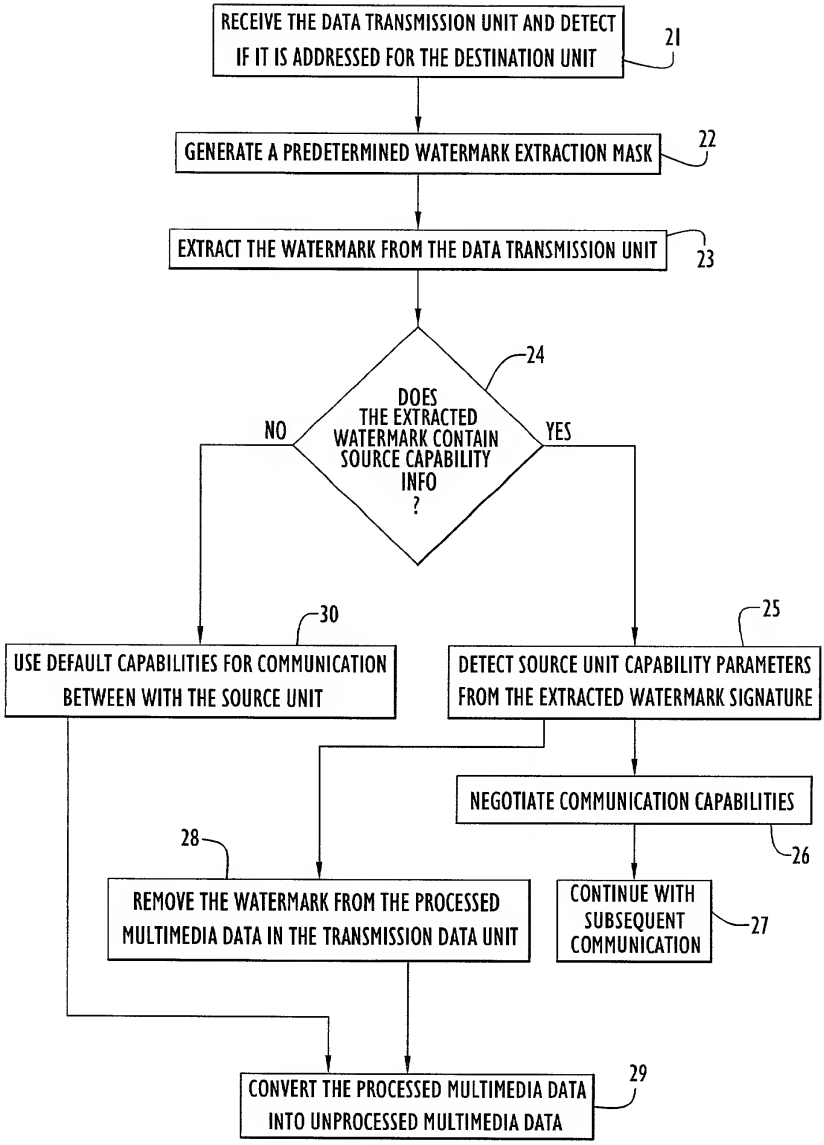
RECEIVE THE DATA TRANSMISSION UNIT AND DETECT IF IT IS ADDRESSED FOR THE DESTINATION UNIT
21
GENERATE A PREDETERMINED WATERMARK EXTRACTION MASK
22
EXTRACT THE WATERMARK FROM THE DATA TRANSMISSION UNIT
23
DOES THE EXTRACTED WATERMARK CONTAIN SOURCE CAPABILITY INFO ?
24
NO
YES
USE DEFAULT CAPABILITIES FOR COMMUNICATION BETWEEN WITH THE SOURCE UNIT
30
DETECT SOURCE UNIT CAPABILITY PARAMETERS FROM THE EXTRACTED WATERMARK SIGNATURE
25
NEGOTIATE COMMUNICATION CAPABILITIES
26
REMOVE THE WATERMARK FROM THE PROCESSED MULTIMEDIA DATA IN THE TRANSMISSION DATA UNIT
28
CONTINUE WITH SUBSEQUENT COMMUNICATION
27
CONVERT THE PROCESSED MULTIMEDIA DATA INTO UNPROCESSED MULTIMEDIA DATA
29

FIG.3

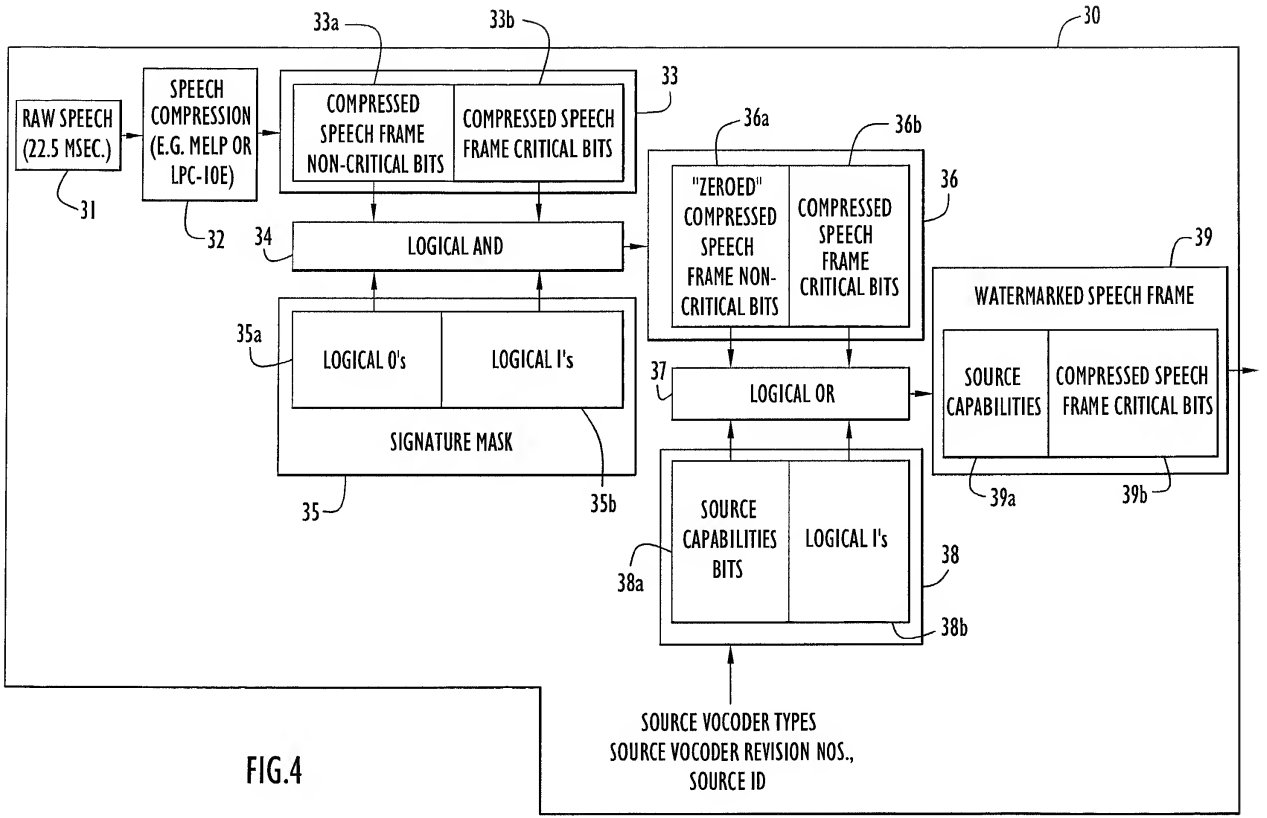
30
33a
33b
33
RAW SPEECH (22.5 MSEC.)
31
SPEECH COMPRESSION (E.G. MELP OR LPC-10E)
32
COMPRESSED SPEECH FRAME NON-CRITICAL BITS
COMPRESSED SPEECH FRAME CRITICAL BITS
34
LOGICAL AND
35a
LOGICAL 0's
LOGICAL 1's
SIGNATURE MASK
35
35b
36a
36b
36
"ZEROED" COMPRESSED SPEECH FRAME NON-CRITICAL BITS
COMPRESSED SPEECH FRAME CRITICAL BITS
37
LOGICAL OR
39
WATERMARKED SPEECH FRAME
SOURCE CAPABILITIES
COMPRESSED SPEECH FRAME CRITICAL BITS
39a
39b
38a
SOURCE CAPABILITIES BITS
LOGICAL 1's
38
38b
SOURCE VOCODER TYPES
SOURCE VOCODER REVISION NOS.,
SOURCE ID

FIG.4

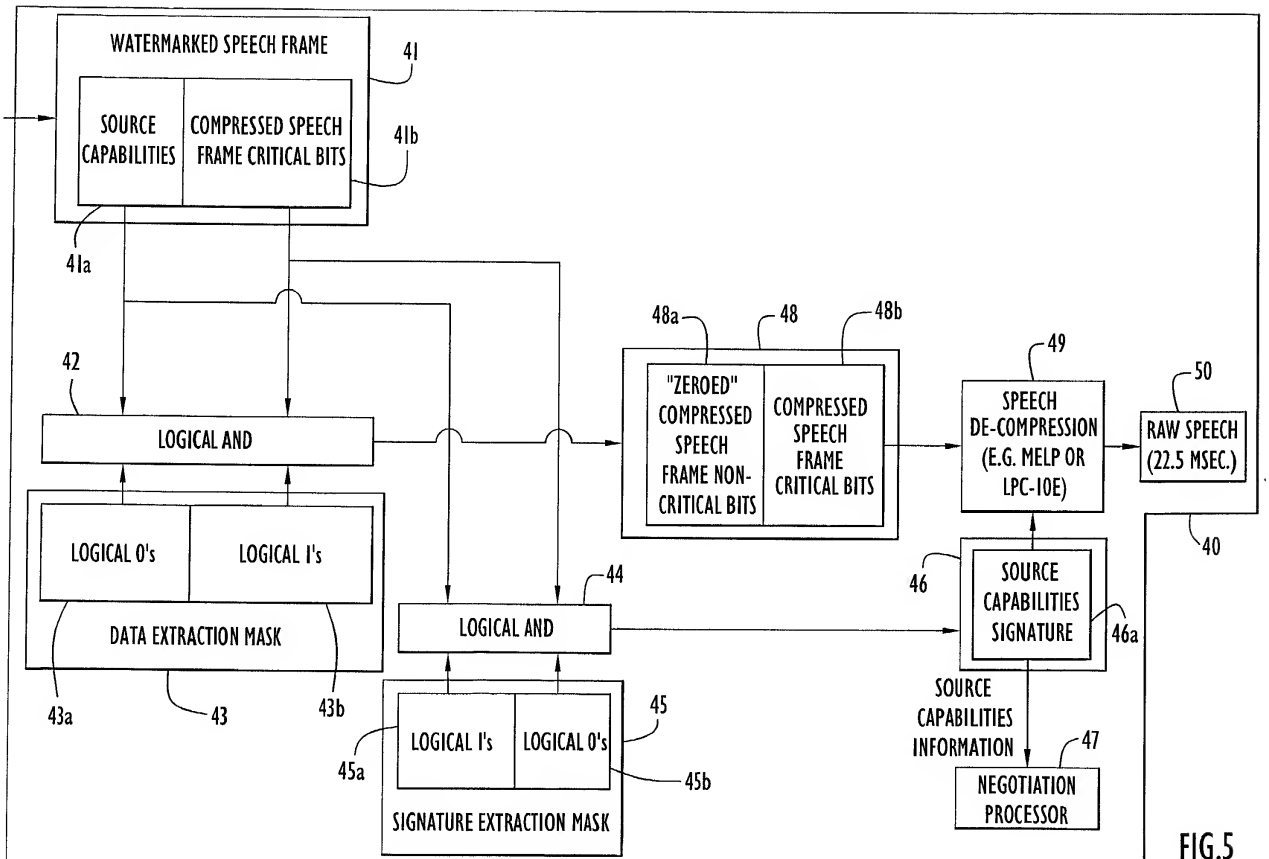
WATERMARKED SPEECH FRAME
41
SOURCE CAPABILITIES
COMPRESSED SPEECH FRAME CRITICAL BITS
41b
41a
42
LOGICAL AND
LOGICAL 0's
LOGICAL 1's
DATA EXTRACTION MASK
43a
43
43b
48a
48
48b
"ZEROED" COMPRESSED SPEECH FRAME NON-CRITICAL BITS
COMPRESSED SPEECH FRAME CRITICAL BITS
49
SPEECH DE-COMPRESSION (E.G. MELP OR LPC-10E)
50
RAW SPEECH (22.5 MSEC.)
40
44
LOGICAL AND
46
SOURCE CAPABILITIES SIGNATURE
46a
SOURCE CAPABILITIES INFORMATION
45
LOGICAL 1's
LOGICAL 0's
45a
45b
SIGNATURE EXTRACTION MASK
47
NEGOTIATION PROCESSOR

FIG.5

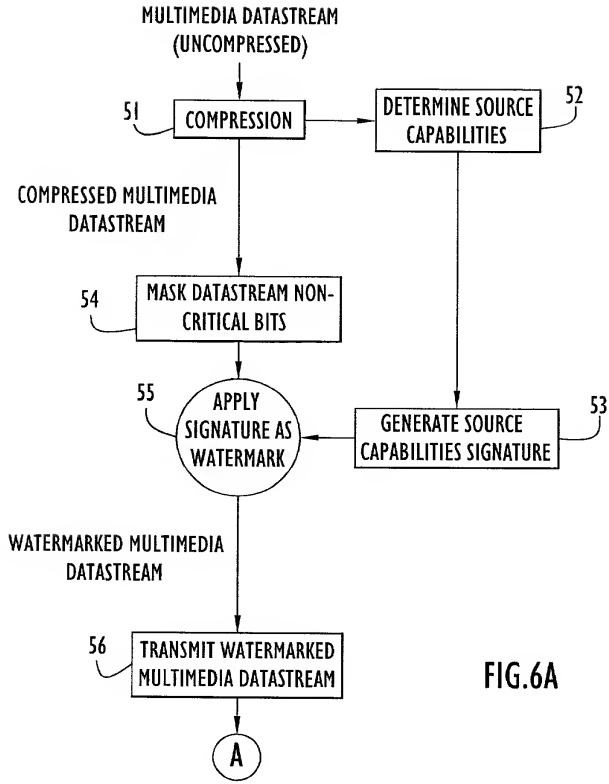
MULTIMEDIA DATASTREAM
(UNCOMPRESSED)
51
COMPRESSION
DETERMINE SOURCE
CAPABILITIES
52
COMPRESSED MULTIMEDIA
DATASTREAM
54
MASK DATASTREAM NON-
CRITICAL BITS
55
APPLY
SIGNATURE AS
WATERMARK
GENERATE SOURCE
CAPABILITIES SIGNATURE
53
WATERMARKED MULTIMEDIA
DATASTREAM
56
TRANSMIT WATERMARKED
MULTIMEDIA DATASTREAM
A

FIG.6A

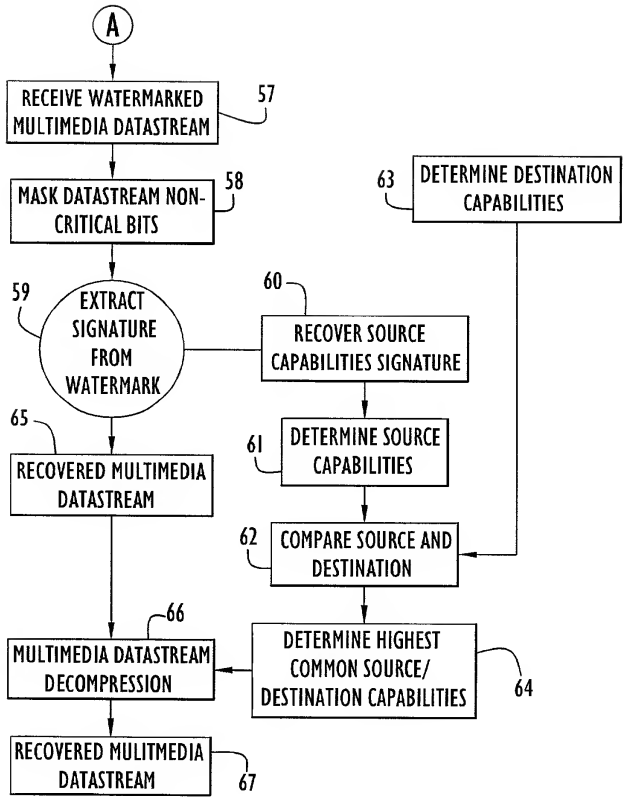
A
RECEIVE WATERMARKED MULTIMEDIA DATASTREAM
57
MASK DATASTREAM NON-CRITICAL BITS
58
63
DETERMINE DESTINATION CAPABILITIES
59
EXTRACT SIGNATURE FROM WATERMARK
60
RECOVER SOURCE CAPABILITIES SIGNATURE
65
RECOVERED MULTIMEDIA DATASTREAM
61
DETERMINE SOURCE CAPABILITIES
62
COMPARE SOURCE AND DESTINATION
66
MULTIMEDIA DATASTREAM DECOMPRESSION
DETERMINE HIGHEST COMMON SOURCE/ DESTINATION CAPABILITIES
64
RECOVERED MULITMEDIA DATASTREAM
67

FIG.6B